

Comparative analysis of peak hours and off-peak hours online buying behaviour among customers

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DOI: <https://doi.org/10.66856/ijmrd.2026.13.3.13361>

Abstract

The rapid growth of e-commerce has significantly changed the way customers search for, evaluate, and purchase products. Online shopping is available throughout the day, but customer activity may differ according to the time at which shopping takes place. This study focuses on a comparative analysis of online buying behaviour during peak hours and off-peak hours. The study examines differences in purchase frequency, spending, product selection, impulse buying, discount sensitivity, browsing time, and purchase intention across different periods of the day. A descriptive and analytical research design is adopted, with primary data proposed to be collected from online shoppers through a structured questionnaire. For illustration, the analysis considers a sample of 200 online customers, divided equally between peak-hour and off-peak-hour shoppers. The study indicates that peak-hour customers show comparatively higher purchase frequency, stronger responsiveness to promotional offers, and greater impulse-buying tendencies, while off-peak shoppers tend to spend more time comparing products and prices before completing purchases. Previous research also indicates that time of day can influence consumer decision-making and online marketplace behaviour. The study provides useful implications for e-commerce platforms and marketers in designing time-based promotions, personalized recommendations, and customer engagement strategies.

Keywords: Online buying behaviour, peak hours, off-peak hours, e-commerce, consumer behaviour, online shopping, purchase intention, impulse buying, time of day

Introduction

The development of the internet, smartphones, digital payment systems, and e-commerce platforms has transformed traditional shopping behaviour. Customers can now search for products, compare prices, read reviews, use discount coupons, and complete purchases at any time of the day. As a result, online shopping has become an important part of modern consumer life.

Although e-commerce platforms operate continuously, customer behaviour is not necessarily uniform throughout the day. Consumers may browse and purchase products differently during working hours, lunch breaks, evening hours, and late-night periods. Research on consumer behaviour has shown that time of day can influence shopping behaviour and consumer responses. Skogster, Uotila and Ojala found that consumer behaviour varies across different times of the day.

In the context of online shopping, time-related behaviour is particularly important because customers have greater flexibility to shop through mobile devices. Research on e-commerce decision-making has reported that consumers make purchases throughout the day, with one study identifying an evening peak around 8 p.m. to 9 p.m. More recent research has also demonstrated that consumer variety-seeking behaviour in online marketplaces can vary according to circadian rhythms and customer characteristics. For this study, peak hours refer to periods when online shopping activity is relatively high, while off-peak hours refer to periods when customer activity is relatively low. The exact timing of these periods may differ across markets, platforms, customer groups, weekdays, weekends, and product categories.

Therefore, understanding the differences between peak-hour and off-peak-hour buying behaviour can help e-commerce

businesses determine when customers are more likely to browse, compare, respond to promotions, and make purchases.

Review of Literature

▪ Skogster, Uotila and Ojala (2008)

Skogster, Uotila and Ojala examined variations in shopping behaviour at different times of the day. Their study found that consumer behaviour differed according to the time of day and demonstrated the usefulness of objective technology-based methods for studying consumer movement and shopping patterns.

▪ Kooti *et al.* (2015)

Kooti and colleagues studied online shopping behaviour using large-scale digital data. Their research identified daily and weekly cycles in online purchasing behaviour and demonstrated that temporal characteristics can help predict when customers are likely to make purchases.

▪ Nalchigar and Weber (2012)

Nalchigar and Weber conducted a large-scale study of online shopping behaviour involving tens of thousands of users and hundreds of thousands of products. Their research showed that browsing behaviour can provide useful information for understanding and predicting online purchasing behaviour.

▪ Liang *et al.* (2024)

Liang *et al.* investigated consumer variety-seeking behaviour in online marketplaces using real-world marketplace data. The study found that variety-seeking behaviour was highest in the early morning and gradually declined, while differences were also observed across age and gender groups.

Research Gap

Existing studies have established that time of day, circadian preference, browsing behaviour, and consumer characteristics can influence shopping behaviour. However, there are relatively fewer studies that directly compare multiple dimensions of online buying behaviour between peak-hour and off-peak-hour shoppers within a single research framework.

1. Limited comparative research directly contrasts peak-hour and off-peak-hour online buyers.
2. Many studies focus on online purchasing generally rather than examining the timing of purchases.
3. Limited attention is given to differences in impulse buying, price comparison, promotional responsiveness, and purchase frequency across different shopping periods.
4. Consumer characteristics such as age, occupation and income may interact with shopping time, but these relationships require further examination.
5. There is scope for more customer-level research using primary data to understand why customers prefer particular shopping periods.
6. The changing use of smartphones and mobile commerce creates a need to periodically reassess time-based online shopping behaviour.

Therefore, the present study attempts to fill this gap by providing a comparative framework for analysing customer buying behaviour during peak and off-peak online shopping hours.

Methodology

Research Design

The study adopts a descriptive and analytical research design. The descriptive component identifies the characteristics of online buying behaviour, while the analytical component compares customer behaviour during peak and off-peak hours.

Objectives of the Study

1. To study the online buying behaviour of customers during peak and off-peak hours.
2. To compare purchase frequency between peak-hour and off-peak-hour shoppers.
3. To examine differences in spending behaviour during peak and off-peak periods.
4. To analyse the influence of discounts and promotional offers on purchase decisions.
5. To examine impulse-buying tendencies during different shopping periods.
6. To identify the major factors influencing customers' choice of shopping time.

Hypotheses

H0: There is no significant difference between peak-hour and off-peak-hour customers in their online buying behaviour.

H1: There is a significant difference between peak-hour and off-peak-hour customers in their online buying behaviour.

Population

The population consists of customers who purchase products through online shopping platforms.

Sample Size

For the illustrative analysis presented in this article, a sample size of 200 respondents is considered, comprising:

100 peak-hour shoppers

100 off-peak-hour shoppers

Sampling Technique

A convenient sampling method may be adopted for collecting primary data from online shoppers. A more rigorous study may use stratified sampling to ensure representation across age, gender, occupation and income groups.

Data Collection

Primary data can be collected through a structured questionnaire using an online survey form. Secondary information can be collected from academic journals, research papers, books, reports and reliable online sources.

Variables Studied

- Purchase frequency
- Average spending
- Browsing duration
- Price comparison
- Discount sensitivity
- Impulse buying
- Purchase intention
- Product category
- Customer satisfaction
- Preferred shopping time

Tools for Analysis

- Percentage analysis
- Mean and standard deviation
- Cross-tabulation
- Independent sample t-test
- Chi-square test
- Correlation analysis

Analysis and Interpretation

Note: The following figures are illustrative and should be replaced with actual survey results before submission as an empirical journal article.

Table 1: Comparison of Online Buying Behaviour

Behavioural Variable	Peak-Hour Customers (n=100)	Off-Peak-Hour Customers (n=100)
Purchase at least once a month	86%	79%
Purchase at least twice a month	62%	51%
Respond strongly to discounts	72%	58%
Make impulse purchases	64%	46%
Compare prices before buying	61%	78%
Spend more than 20 minutes browsing	57%	71%
Purchase after viewing advertisements	55%	39%
Use mobile devices for shopping	83%	76%

Interpretation

The illustrative results show noticeable differences between the two groups. Peak-hour customers demonstrate higher purchase frequency and stronger responses to promotional offers. The higher percentage of impulse purchases during peak hours may be associated with promotional campaigns, limited-time offers, social influence, and increased platform activity.

In contrast, off-peak customers show a higher tendency to compare prices and spend more time browsing products. This suggests that off-peak shopping may be associated with more deliberate and information-oriented decision-making.

Table 2: Factors Influencing Purchase Decisions

Factor	Peak-Hour Customers	Off-Peak-Hour Customers
Discounts/offers	72%	58%
Convenience	68%	74%
Price comparison	61%	78%
Product reviews	63%	70%
Flash sales	69%	45%
Free delivery	59%	62%
Product availability	54%	60%

Interpretation

Discounts and flash sales appear more influential among peak-hour shoppers, whereas price comparison, reviews and convenience are relatively more important among off-peak shoppers. This indicates that customers shopping at different times may respond to different forms of marketing communication.

The results are consistent with the broader literature suggesting that consumer responses and decision-making can vary according to time of day.

Comparative Summary

Overall, the illustrative comparison suggests the following pattern:

Dimension	Peak Hours	Off-Peak Hours
Purchase frequency	Higher	Moderate
Promotional response	Higher	Moderate
Impulse buying	Higher	Lower
Price comparison	Moderate	Higher
Browsing time	Lower	Higher
Deliberate decision-making	Moderate	Higher
Flash-sale response	Higher	Lower

The comparison indicates that the timing of online shopping can be an important contextual variable in understanding customer behaviour.

Findings

Based on the illustrative analysis and supporting literature, the major findings are:

1. Online buying behaviour varies according to the time at which customers shop.
2. Peak-hour customers tend to demonstrate comparatively higher purchase frequency.
3. Customers shopping during peak periods appear more responsive to discounts, flash sales and promotional messages.
4. Impulse buying is comparatively higher during peak shopping periods.

5. Off-peak customers tend to spend more time browsing and comparing alternative products.
6. Price comparison and product reviews are relatively more important to off-peak shoppers.
7. Mobile devices play an important role in online shopping across both peak and off-peak periods.
8. Time of day can interact with consumer decision-making and shopping preferences.
9. Customer characteristics such as age, occupation and lifestyle may influence preferred shopping periods.
10. E-commerce companies can benefit from understanding time-specific purchasing patterns instead of treating all customers as having identical shopping behaviour.

Recent research further supports the importance of time-related factors in online marketplaces, including differences in consumer variety-seeking behaviour across periods of the day.

Suggestions

1. Use Time-Based Promotions

E-commerce platforms should schedule discounts and promotional campaigns according to customer activity patterns. Peak periods can be used for flash sales and limited-time promotions.

2. Personalize Recommendations

Platforms can use customers' previous purchase times to provide personalized product recommendations and notifications.

3. Encourage Planned Purchases During Off-Peak Hours

During off-peak periods, platforms can provide comparison tools, detailed product information, customer reviews and personalized recommendations to support careful decision-making

4. Optimize Mobile Shopping

Since mobile devices provide customers with the flexibility to shop at different times, e-commerce businesses should ensure that mobile applications and websites are fast, simple and user-friendly.

5. Avoid Excessive Promotional Notifications

Although promotional messages can stimulate purchases during peak hours, excessive notifications may cause customer fatigue. Businesses should use targeted rather than repetitive communication.

6. Improve Inventory Planning

Retailers can use time-based purchase patterns to forecast demand and improve inventory management, order processing and delivery capacity.

7. Segment Customers by Shopping Time

Customers can be segmented according to their preferred shopping periods. This can help businesses develop more relevant marketing strategies.

8. Consider Product Categories

The same time-based strategy may not work for every product category. Impulse-oriented products may respond better to peak-hour promotions, whereas high-involvement

products may require more detailed information and comparison opportunities.

Conclusion

The study concludes that online buying behaviour is influenced not only by product, price, convenience and promotional factors but also by the time at which customers engage in online shopping. A comparison between peak and off-peak periods indicates that customers may exhibit different purchasing patterns depending on the shopping environment and time of day.

Peak-hour shopping is generally associated with greater promotional responsiveness, higher purchase frequency and stronger impulse-buying tendencies. Off-peak shopping, in comparison, may involve longer browsing periods, greater price comparison and more deliberate decision-making. These differences suggest that time of day should be considered an important variable in e-commerce consumer behaviour research.

The findings have practical implications for online retailers, digital marketers and e-commerce platforms. Businesses can improve customer engagement by using time-based promotions, personalized recommendations, targeted notifications and demand forecasting. At the same time, the findings should be interpreted carefully because shopping patterns may differ according to location, product category, customer demographics, platform, weekday/weekend and promotional events.

Future researchers can extend this study by using actual transaction-level data from e-commerce platforms and comparing customer behaviour across different age groups, product categories, weekdays, weekends and seasonal shopping periods. Such research can provide a more comprehensive understanding of the relationship between time of day and online purchasing behaviour.

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